

## MEMS-BASED SPECTROPHOTOMETRIC SYSTEM

### ABSTRACT OF THE DISCLOSURE

A portable spectrophotometric system for detecting one or more target substances. In a  
5 representative embodiment, a system of the invention has an optical grating, an array of photo-  
detectors, and a MEMS device having a movable plate positioned between the grating and the array.  
Light transmitted through a gaseous sample is dispersed by the grating and is imaged onto the  
movable plate, which has a plurality of openings corresponding to selected infrared absorption lines  
of the target substance. A small-amplitude oscillation is imparted onto the plate such that the  
10 openings periodically move in and out of alignment with the corresponding intensity features in the  
image, which modulates electrical signals generated by the corresponding photo-detectors. A lock-  
in signal processor analyzes the modulation pattern by comparing it to the pattern expected in the  
presence of the target substance. When a positive correlation between the patterns is established,  
the system warns the user about the presence of the target substance.